

## FINAL SCIENTIFIC REPORT FOR XMM-NEWTON GRANT

---

REPORT TYPE – Final Summary of Research

PRINCIPAL INVESTIGATOR – Dr. Niel Brandt

GRANT NUMBER - NAG5-9933

GRANT TITLE - An XMM-Newton Study of the Bright Ultrasoft Narrow-Line Quasar NAB 0205+024

TIME PERIOD – 9/15/00-9/14/03

RECIPIENT'S INSTITUTION – The Pennsylvania State University  
Office of Sponsored Programs  
110 Technology Center Building  
University Park, PA 16802

XMM-Newton acquired data on the accepted target, NAB 0205+024, on 2002 July 23. About half of the data were damaged due to background flaring. However, the derived results were still of significant interest and are reported in a paper currently in press with MNRAS:

"The Narrow-Line Quasar NAB 0205+024 Observed with XMM-Newton",  
Gallo L.C., Boller Th., Brandt W.N., Fabian A.C., Vaughan S.,  
2004, Monthly Notices of the Royal Astronomical Society,  
in press; astro-ph/0408507

The broad-band X-ray continuum of NAB 0205+024 is well constrained due to the excellent photon statistics obtained (about 97,700 counts), and its impressive soft X-ray excess is clearly apparent. The hard X-ray power law has become notably steeper than when NAB 0205+024 was observed with ASCA, attesting to the presence of significant X-ray spectral variability. A strong and broad emission feature is detected from about 5 to 6.4 keV, and we have modeled this as a relativistic line emitted close to the black hole from a narrow annulus of the accretion disk. Furthermore, a strong X-ray flare is detected with a hard X-ray spectrum; this flare may be responsible for illuminating the inner line-emitting part of the accretion disk. The combined observational results can be broadly interpreted in terms of the "thundercloud" model proposed by Merloni & Fabian (2001).

The relevant XMM-Newton grant is acknowledged in the paper above, and the paper is publicly available at:  
<http://arxiv.org/abs/astro-ph/0408507>

Thank you for supporting this XMM-Newton project. Please let me know if you have any questions or feedback.